ARMY SERVICE FORCES MANUAL

M 365-6

CIVIL AFFAIRS HANDBOOK

PHILIPPINE ISLANDS

SECTION 6: NATURAL RESOURCES

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HEADQUARTERS, ARMY SERVICE FORCES, 29 MARCH 1944

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Civil Affairs

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HEADQUARTERS, ARMY SERVICE FORCES,
Washington 25, D. C., 29 March 1944

Army Service Forces Manual M 365 - 6, Civil Affairs Handbook - Philippine Islands, Section 6, Natural Resources, has been prepared under the supervision of The Provost Marshal General, and is published for the information and guidance of all concerned.

[SPX 461 (21 Sep 43).]

By command of Lieutenant General SOMERVELL:

W. D. STYER,
Major General, General Staff Corps,
Chief of Staff.

OFFICIAL:
J. A. ULIO,
Major General,
Adjutant General.

This study on Natural Resources in the Philippine Islands was prepared for the

MILITARY GOVERNMENT DIVISION, OFFICE OF THE PROVOST MARSHAL GENERAL

by the

FAR EASTERN UNIT, BUREAU OF FOREIGN AND DOMESTIC COMMERCE

OFFICERS USING THIS MATERIAL ARE REQUESTED TO MAKE SUGGESTIONS AND CRITICISMS INDICATING THE REVISIONS OR ADDITIONS WHICH WOULD MAKE THIS MATERIAL MORE USEFUL FOR THEIR PURPOSES. THESE CRITICISMS SHOULD BE SENT TO THE CHIEF OF THE LIAISON AND STUDIES BRANCH, MILITARY GOVERNMENT DIVISION, PMGO, 2807, MUNITIONS BUILDING, WASHINGTON 25, D. C.

INTRODUCTION

Purposes of the Civil Affairs Handbook.

The basic purposes of civil affairs officers are (1) to assist the Commanding General by quickly establishing those orderly conditions which will contribute most effectively to the conduct of military operations, (2) to reduce to a minimum the human suffering and the material damage resulting from disorder and (3) to create the conditions which will make it possible for civilian agencies to function effectively.

The preparation of Civil Affairs Handbooks is a part of the effort to carry out these responsibilities as efficiently and humanely as possible. The Handbooks do not deal with plans or policies (which will depend upon changing and unpredictable developments). It should be clearly understood that they do not imply any given official program of action. They are rather ready reference source books containing the basic factual information needed for planning and policy making.

CIVIL AFFAIRS HANDBOOKS

TOPICAL OUTLINE

1. Geographical and Social Background
2. Government and Administration
3. Legal Affairs
4. Government Finance
5. Money and Banking
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7. Agriculture
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16. Public Welfare
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NATURAL RESOURCES

NATURAL RESOURCES

General Statement: The Philippines are rich in natural resources. A tropical climate, fertile coastal plains well distributed throughout the archipelago, and extensive river valleys on the two largest islands -- Luzon and Mindanao -- combine to form the basis of developed agriculture, which is the heart of Philippine economy. 1/ Several other natural endowments, however, are important additional sources of national wealth and income.

Extensive mountainous areas on practically all of the larger islands contribute mineral wealth -- both in gold and silver -- while forest lands, covering 60 percent of the total land area of 115,000 square miles, yield important commercial species of tropical hardwoods, as well as gums and resins, rattans, palms and other products entering into various phases of economic life. Lengthy seacoasts and inland bodies of water yield an abundant supply of fish, the annual catch giving place only to rice in the nation's dietary. Finally, many rivers and streams, rising in high altitudes, are a potential though as yet little developed source of water power.

I. Mining

Although gold, coal and iron were produced in a very small way even prior to the Spanish regime in the Philippines, commercial production of gold on an appreciable scale was not started until 1913, while active exploration of base metals -- long known to exist -- began only in 1935.

1/ See Part VII of the Handbook for a discussion of Philippine agriculture.

From the beginning of more extensive exploitation, gold was mined almost entirely for sale to the United States, which country later became the principal market for Philippine chromite. It was Japan's active buying of base metals, however, following her early aggressive moves in 1932, which stimulated interest in Philippine deposits of iron, manganese and copper. Both volume and value of mineral production have increased steadily in recent years, until in 1940 the industry ranked third in value of output, after rice and sugar. As a group, mineral products followed sugar in Philippine exports, accounting for 30 percent of total export trade in 1940.

The combined output of gold and base metals in 1940 was valued by the Chamber of Mines, Manila, at 92,832,000 pesos,1/ a gain of 9.5 percent over the previous year. The industry paid the highest wages in the Philippines, disbursing an aggregate of 21,980,000 pesos to nearly 43,000 laborers, and paying 5,180,000 pesos in salaries, in 1940. It contributed 7,447,600 pesos to Government revenue from taxation, and spent about 4,870,000 pesos for Philippine lumber. Over 36,000,000 pesos were invested in machinery, equipment and supplies, imported mainly from the United States, while about 18,000,000 pesos were paid in dividends to stockholders.

(a) Government Policy

Under the Philippine Commonwealth's mining laws, all mineral lands and minerals of the public domain belong to the State, and parties registering claims may obtain leases only. Ownership of agri-

1/ Peso equals $0.50 in U.S. currency. (Prewar value).

cultural land does not include the right to extract minerals which may be found beneath the surface.

In keeping with the nationalization policy of the Commonwealth Government, exploitation of mineral lands is limited to citizens of the Philippines or to corporations at least 60 percent of the capital of which is owned by such citizens. A provision stipulates, however, that during the Commonwealth period citizens of the United States, or corporations organized under the laws of the United States, are to enjoy the same rights as citizens or corporations of the Philippines.

The exploitation and disposition of fuel minerals, such as coal, petroleum and gas, is governed by separate legislation, but the provisions regarding nationalization are the same. Terms of mining leases are restricted to 25 years, although under certain conditions one renewal for another 25-year period is permissible.

Administration and disposition of mineral lands, as well as geological surveys, are under the jurisdiction of the Bureau of Mines, Department of Agriculture and Commerce. Actual prospecting and exploitation by the Government has been limited to iron, coal and petroleum. While the influence of American mining engineers has been a notable factor in developing the mineral resources of the Philippines, operation and control of the mines, with few exceptions, have been essentially in the hands of local capital.

(b) Gold and Silver

Modern gold mining in the Philippines developed in three waves, the first dominated by early activities of the Benguet Consolidated Mining Company in Mountain Province, Luzon, some 30 years ago. Prof-

its from these operations financed the Balatoc Mining Company, the success of which by 1927 constituted the second wave and eclipsed that of the parent company. This achievement also extensively stimulated interest in prospecting. The third wave came in 1933 when the increase in price of gold encouraged development of low-grade properties previously regarded as unprofitable. Several new producing companies of fairly large proportions came from those efforts. In 1940 there were 50 gold lode mines (including two copper producers) and five placer properties, together producing a total of 1,096,745 fine ounces of gold, valued at 76,564,000 pesos.1/ During the five years 1936-1940 production averaged 880,220 ounces valued at 61,408,400 pesos. Investment in the industry is predominately American and Philippine capital.

Gold mining claims have been filed in practically every province in the Philippines. Actual production, however, is confined largely to five regions:

1. Mountain Province in Northern Luzon, cradle of the industry and by far the most important producing area;
2. The Visayan Island of Masbate;
3. Paracale and Jose Panganiban (formerly Mambulao) districts in the province of Camarines Norte, Southern Luzon;
4. The Surigao district, Surigao Province, Northern Mindanao;
5. The Central and Southern Luzon districts, where companies operated in Bulacan Province, northeast of Manila, and in Camarines Sur.

1/ Review of Mining Activities in the Philippines During 1940 by the Chamber of Mines, and Yearbook of Philippine Statistics, 1940.

There are, besides scattered gold mining, operations in the provinces of Zamboanga and Davao, in Mindanao; in Batangas Province, Southern Luzon; and on the Visayan island of Leyte.

The most important mines in each of the five leading producing areas are listed below:

Principal Philippine Gold Mines

Mine	Location	Value of tons milled - 1940 1/
Mountain Province:		
Antamok Goldfields	Itogon	$ 1,315,000
Baguio Gold	Itogon	1,114,000
Balatoc	Itogon	6,703,000
Benguet Consolidated	Itogon	5,495,000
Big Wedge	Itogon	1,057,000
Cal Horr	Baguio	722,700
Itogon	Itogon	2,685,000
Suyoc Consolidated	Mankayan	1,001,000
Masbate:		
I.X.L.	Balete	1,540,000
Masbate Consolidated	Guinobatan	3,186,000
Paracale:		
Coco Grove 2/	Paracale	1,948,000
Paracale-Gumaus	Paracale	959,000
San Mauricio	Jose Panganiban	2,999,700
United Paracale	Paracale	1,633,000
Surigao:		
Mindanao Mother Lode	Surigao	1,092,000
Surigao Consolidated	Mainit	1,090,000
Luzon:		
Ipo Gold	Norzagaray, Bulacan Province.	360,000
Treasure Island	Lahuy Island, Camarines Sur	769,000

1/ Review of Mining Activities, 1940, by the Chamber of Mines of the Philippines.

2/ Placer Mine.

Importance of the industry to the different sections is, naturally, varied and somewhat difficult to determine. Because of the long-established and more extensive operations in Mountain Province, Luzon, however, gold mining is undoubtedly most important in that region, although the more recent developments in Southern Luzon have contributed very materially to increased business activity in that area. The gold mining industry was not directly affected by trade or economic provisions of the Independence Law. In anticipation of independence, however, activities were so greatly accelerated in recent years that it was believed production of Philippine gold may have reached its peak about 1940. A number of the larger mines were reported to be utilizing secondary reserves, and no new extensive developments were under consideration. It was expected that output would remain for several years at a fairly stable level in the neighborhood of 80,000,000 pesos.

Rehabilitation of Gold Mining Properties Probably Difficult for Japan - Following the invasion, word was received in this country from several sources that American forces did a very thorough job of flooding Philippine gold mines, and that the Japanese stripped the mills and power houses of equipment. Although intercepts of Japanese broadcasts have revealed a plan to discontinue the operation of small and middle sized gold mines in Japan as an economy measure, and replace their output with gold from the Philippines, considerable outlay of capital and labor would be required to put the mines in working order and it does not seem likely that Japan would undertake such a project in the near future. Base metals, far more important to her war effort, are now engaging the attention of Japan's mining engineers. Information from several sources indicates that gold mining equipment has been installed in the recently expanded copper mine at Lepanto, Luzon.

Silver - Silver was mined as a by-product of gold, and shipped entirely to the United States. Production increased steadily in recent years, keeping pace with the greater output of gold and averaging about 300,000 ounces in excess of gold. In 1940, 1,394,700 fine ounces of silver were mined, valued at 1,874,000 pesos.

(c) Base Metals

Principal base metals produced in the Islands are iron ore -- by far the most important -- chrome and manganese ores, copper ore, and copper concentrates. Total production of base metals in 1940 amounted to about 1,500,000 tons, valued at approximately 14,000,000 pesos, compared with about 600,000 tons in 1936, valued at 2,400,000 pesos.

1. Iron: Prior to 1934 a few pounds of iron ore had been shipped to the United States and an even smaller amount to Great Britain, probably as samples, but in that year the first shipments were made to Japan, amounting to 7,240 tons. Production increased at a rapid rate from then on, and in 1939 exports exceeded 1,000,000 tons, of which all but 20 tons -- sent to the United States -- went to Japan. Thereafter shipments were entirely to Japan, amounting in 1940 to 1,192,000 tons, valued at 5,529,480 pesos. With the freezing of Japanese assets in the Philippines in June 1941, and subsequent scarcity of Japanese shipping, exports to Japan totaled only 17,500 tons in August 1941, while no shipments were made in the three remaining months before December 7. With the loss of the Japanese market, Philippine iron mines were forced to close.

No complete and accurate survey of iron ore deposits has been made, but previous to the war, the ore was mined at two points in the province of Camarines Norte, Southern Luzon, at one mine on the island of Samar, the most eastern of the Visayan group, and on Marinduque Island, which is south of Luzon and east of Mindoro. Of the four producing mines, the largest -- Philippine Iron Mines -- operating on Larap Peninsula on the northern coast of Camarines Norte, is American-owned. Reserves of this mine are estimated at from four to five million tons of ore, averaging better than 60 percent Fe. Sales in 1940 totaled 524,000 tons, or 43 percent of the total production.

The second largest mine -- Samar Mining Company -- accounting for 30 percent of the total sales in 1940, is the property of the Elizalde family (Spanish nationality and Philippine citizenship), in the extreme southeastern part of Samar. Reserves are estimated at 1,500,000 tons of high-grade ore, averaging 60 percent or over.

Located in the Paracale gold mining district in Camarines Norte is the third largest mine - Insular Mine Operators -- operated under Philippine ownership, but reported to have had Japanese financial backing. With reserves estimated at 2,000,000 tons, some of the ore assayed as high as 69 percent Fe. Shipment from this mine did not start until mid-1939, with production by 1940 comprising about 17 percent of the total output of iron ore.

The fourth mine -- Gold Star Mining Company -- located in the northwestern part of the island of Marinduque, accounted for 10 percent of total production in 1940. The mine is of Filipino ownership.

Reserves are variously estimated at from one to ten million tons. Some of the ore assays as high as 65 percent Fe.

In addition to the output of these four mines, there have been for many years about 200 tons of iron ore produced annually in Bulacan Province, Central Luzon, where deposits are operated by Filipinos using primitive methods. Production is entirely for domestic smelting in small, crude blast furnaces for the manufacture of simple agricultural implements.

Extensive Government-owned Iron Deposits in Mindanao - The most extensive known iron deposits are those owned by the Philippine Government in Surigao Province, Northern Mindanao. Surveys indicate that reserves approximate 500,000,000 tons, but that the ore is of rather low grade, averaging about 47 percent Fe. It also contains nickel, chromite and aluminum. Although the Surigao deposit was discovered more than 25 years ago, it has not been commercially developed. Several years ago Japan offered to mine the ore if allowed to operate on a lease-royalty basis. The offer was refused, as the Philippine Government wished to reserve profits of mining for Filipinos and to sell ore rather than to lease mines. The National Development Company, therefore, was charged with the development of all Government-owned mineral properties. Consideration was given to the erection of a smelter and a small steel plant in Mindanao, but prior to the war preliminary studies of sites, power supply and markets had not been completed. It was suggested that power could be obtained from development of Christina Falls in Northern Mindanao, and coal from Malangas, in Zamboanga Province, should the venture be decided upon.

Japanese Interest in Iron Reserves - In connection with propaganda apparently intended to encourage migration to Mindanao, a Japanese spokesman recently stated that the southern island is best suited for settlers, and emphasized the "virtually inexhaustible iron ore supply in Surigao and favorable site for electric power and industrial development." The Japanese are believed to be keenly interested in the large Surigao reserves, with engineers and metallurgists studying problems of mining and utilization of the ore. Moreover, they doubtless have access to the findings and records of former specialists of the Philippine Government. Unless in possession of the Islands for considerable time, however, it seems hardly likely that they would be able to complete plans for industrialization in Mindanao. 1/

Although operation of the open-pit type of base metal mine in the Philippines is relatively simple -- requiring little more than hand labor -- it does not appear that shipments of iron ore to Japan were reestablished until late in 1942, if then. At the time of invasion, piers, conveyors, and railways leading to the mines were destroyed or badly damaged, according to reliable reports, and there is no indication that all of the iron mines are being successfully operated. It

1/ A "trick" provision in the Constitution of the "Philippine Republic," inaugurated in October 1943, would enable the Japanese to secure title to the iron reserves in Surigao for the duration of the war. Section 7 of Article XI reads: "The prohibitions and limitations provided in this constitution notwithstanding, the president of the republic of the Philippines may enter into agreement with foreign nations for utilization of the natural resources and operation of public utilities, which agreement shall expire upon termination of the Greater East Asia War."

is reported that the former American-owned mine in Camarines Norte -- Philippine Iron Mines -- is producing under management of Ichiwara Industrial Company of Japan. The scarcity of shipping facilities, however, probably is preventing regular shipment of ore to Japan.

In mid-1943 broadcasts indicated that the Japanese were fostering the establishment of small furnaces using charcoal for the production of pig iron throughout countries of Southeastern Asia, in order to provide at least a part of the plain hardware and farm implements formerly imported.

2. Chrome: Chrome ore was first discovered in the Philippines in 1922 near Candelaria, Zambales Province in Western Luzon, but not until several years later was it realized that the deposit was probably one of the largest in the world, estimates placing reserves at from 10,000,000 to 15,000,000 tons. Analysis of the ore, however, showed it to be of low grade, averaging about 33 percent Cr_2O_3, and higher grade ores found in a number of small deposits were mined first. Such deposits were scattered over a wide area, including Camarines Sur and Ilocos Norte Provinces, Luzon, as well as other sections in Zambales Province. Chrome ore was also found in Antique Province, Panay Island; in Southern Samar, at two points on Dinagat Island; off the northeast coast of Mindanao; and on the mainland of Mindanao in Surigao and Misamis Oriental Provinces. The ore is known to exist also in other localities, but because of inadequate transportation facilities and limited exploration work, little information is available relative to other deposits. As a number of the smaller mines became nearly exhausted, the main production area was centered in Zambales,

where both high-grade ore for metallurgical use and the lower grades suitable for refractory purposes were mined in recent years.1/ In 1940 two American companies operating in Northern Zambales -- Consolidated Mines and Acoje Mining Company -- accounted for 80 percent of the total chrome production. The Philippine Government held three reservations in Zambales Province.

The United States was from the beginning the chief market for Philippine chrome, although Japanese buying became more active about 1939. Shipments to Japan during the five years 1936-1940, however, averaged somewhat over 10,000 tons, compared with average exports to the United States of around 80,000 tons. Of 194,400 tons exported in 1940, the American market consumed 155,130, with the balance going mainly to Japan. Production increased very substantially during 1941 because of greatly accelerated demand from the United States, where stock piles of basic war materials were being accumulated. In the first nine months of 1941 shipments to the American market totaled 205,140 tons, while 43,070 tons went to Japan.

Lighterage Facilities Necessary for Shipment of Ore to Japan - The amount of chrome ore Japan is getting during occupation of the Islands must depend very largely upon the availability of the lighterage facilities necessary in loading the ore. General destruction during hostilities of tugboats and lighters caused a serious shortage,

1/ A Canadian process was reported several years ago for adapting low-grade chrome ore to metallurgical use, but had not been put into practice in the Philippines before the war.

but if that situation is relieved it is thought the Japanese should not encounter any great difficulty in moving as much chrome ore from the Philippines as they can find ships with which to carry it. It is believed, however, that so far they have confined their activities to mining the higher-grade metallurgical ore in the Zambales district.

3. Manganese: Deposits of manganese ore are even more scattered throughout the archipelago than deposits of chrome but, in the order of their importance, the principal producers are in the following locations:

1. Siquijor Island, south of Cebu.
2. Busuanga Island, south of Mindoro in the Palawan group.
3. Baui in Camarines Sur, Southern Luzon.
4. The Siec deposits in Ilocos Norte, Northwestern Luzon.
5. The Guindulman deposits in Bohol Island.
6. Milagros on the west coast of Masbate Island.
7. The Mahinary deposit in Central Panay.

Less important deposits occur in Pangasinan, Nueva Ecija and Abra Provinces in Luzon; in Catanduanes Island off the southeast coast of Luzon; in Tawi-Tawi, in the Sulu Archipelago; and in Mindoro Island. Notwithstanding wide distribution of the ore and its high metal content -- averaging about 50 percent Mm -- several factors have served to retard extensive development of properties. With the exception of Siquijor and Busuanga, deposits are individually small, and many are located in isolated places. The high transportation costs and long distance from markets were unfavorable factors, while frequent litigations with land owners regarding titles tended to discourage prospectors.

Japanese Buying Stimulated Manganese Production - Production, however, increased steadily following Japan's entry into the Philippine base metal market about 1935. While only 255 tons were exported in 1936, the next year shipments amounted to 12,200 tons and by 1940 had increased to over 58,000. Until 1940 nearly all the manganese ore went to Japan, but in that year the United States began heavy purchases for stock piling, which continued in 1941. In the first nine months of 1941 total exports amounted to 50,570 tons, of which 36,210 went to the United States and 14,360 to Japan.

Considerable stocks of manganese ore — believed to have been about 80,000 tons — were awaiting shipment at several points in the Philippines at the time of invasion. As most of it was on Busuanga and Siquijor Islands, where lightering is required, it is understood that by late 1942 the Japanese had not solved the problem of moving the ore. Since then, however, reliable information has been received indicating that the Japanese have succeeded in shipping out stock piles of manganese but have made no attempt to mine the ore.

4. Copper: Copper ores occur in many districts, especially in the vicinity of Mankayan, Mountain Province, Luzon; on Rapu Rapu Island (Albay Province) east of the mainland of Southern Luzon, and in Ilocos Norte Province, Northwestern Luzon. Other deposits are mined in Antique and Capiz Provinces in Panay Island, and in Occidental Negros. Although copper has been reported elsewhere, actual mining and production has occurred only in the districts mentioned, where there is definite knowledge of commercial possibilities.

So far as is known, no large deposits exist, and mines were able in the past to yield profits mainly because of ready access to the Japanese market, the sole outlet for copper ore. Copper concentrates were shipped to the United States as well as to Japan. Seventy percent of the copper concentrates produced in 1940 came from the Mankayan district, while about 85 percent of the ore production originated in the Rapu Rapu mine.

The Lepanto Consolidated Mining Company at Mankayan is American-owned, and together with the Hixbar Mining Company at Rapu Rapu, was operated before the war by Nielson and Company, an American organization. Philippine and some British and German capital also is invested in the copper mining industry.

The Lepanto mine utilized standard equipment throughout its plant, producing a copper and gold concentrate which was trucked to Poro, San Fernando, La Union Province on the northwestern coast of Luzon, for shipment to the United States. Daily capacity of the plant was reported in 1940 to be 500 tons. A smelter was installed at the mine early in 1941. Equipped with blast furnaces, its daily capacity was 100 tons of ore and it was reported to be producing a matte of high copper content for shipment to the United States.

A custom smelter, also equipped with blast furnaces and having a daily capacity in 1941 of 200 tons of ore, was installed in 1937 at Jose Panganiban, in the Paracale mining district of Camarines Norte. It produced a copper matte of 52 percent copper content, which was shipped to Tacoma, Washington, for refining. The smelter treated ore from San Mauricio and United Paracale gold mines in the vicinity.

Ore mined by the Hixbar company on Rapu Rapu Island is of such high grade that concentration is not necessary. The ore is transported by truck about two-and-one-half miles from the mine to the shipping point on the beach at Karogkog, where bins for storage of about 5,000 tons of ore and a pier for loading on ocean-going vessels are available.

Shipments to Japan - Appreciable shipment of copper ore to Japan did not begin until 1937, and in the five years 1936-1940 exports averaged 16,000 tons. In addition, shipments of copper concentrates were made in 1939 and 1940, amounting to 9,960 and 6,220 tons, respectively, of which 7,060 went to Japan in 1939 and 4,390 in 1940, with the balance going almost entirely to the United States.

It is believed that from 2,000 to 2,500 tons of copper matte in storage at Poro -- shipping point for the Lepanto mine -- were taken out by the Japanese soon after their arrival. Early reports indicated that engineers were unable to cope with metallurgical difficulties in reopening the copper mines, but in January 1943 broadcasters claimed that after 10 months of reconstruction work, the majority of the copper mines were restored, and formal mining of copper resumed. By late October Tokyo announced that copper output in the Philippines had increased "many fold," adding that most of the equipment formerly used in gold mining was employed to mine copper.

It would seem questionable, however, whether the majority of copper mines have resumed operation, but more probable that the Japanese have concentrated their efforts chiefly on the Lepanto mine. They are known to be building a branch railway line connecting the terminus of the northern main line at San Fernando, La Union Province, with Sudipen

in Mountain Province, for the transport of ore from Lepanto to San Fernando by rail instead of the former more difficult haul by truck. They also are believed to have materially increased the daily capacity of the mill at Lepanto and to have plans for further expansion in 1944.[1/] Possession of this mine is doubtless one of the most important assets gained by the Japanese in their conquest of the Philippines. While guerrillas have been active in the area, they apparently are not strong enough to capture the mine.

5. Lead: Six gold mining companies produced a total of 2,081,740 pounds of lead concentrates, valued at 118,000 pesos, as a by-product of gold extraction in 1940. The companies were: North Camarines, Paracale-Gumaus, San Mauricio, and United Paracale, all in the Paracale district of Camarines Norte Province; Suyoc Consolidated, Mountain Province, and Surigao Consolidated, Surigao Province, Mindanao.

The leading base metal mines, with location and quantity and value of their sales in 1940, are shown below:

1/ It is understood that the Japanese have used equipment stripped from gold mining plants for new installations at the Lepanto copper mine.

Principal Philippine Base Metal Mines

		Sales	
		Tons	Value
Iron:			
Philippine Iron Mines	Jose Panganiban, Camarines Norte	524,230	$1,161,600
Samar Mining Company	Hernani, Samar	377,430	872,400
Insular Mine Operators	Paracale, Camarines Norte	209,010	470,280
Gold Star Mining Company	Mogpog, Marinduque	125,530	278,180
Chrome:			
Acoje Mining Company	Santa Cruz, Zambales	69,050	534,150
Consolidated Mines	Masinloc, Zambales	79,500	477,480
Zambales Chromite	Santa Cruz, Zambales	15,240	106,230
Filipinas Mining 1/	Santa Cruz, Zambales	13,980	120,595
Manganese:			
Amalgamated Minerals	Coron, Palawan	14,295	223,560
Mine Factors	Siquijor, Oriental Negros	20,170	257,340
Philippine-Nippon	Jose Panganiban, Camarines Norte	5,170	73,775
Cia. Minera de Filipinas	Coron, Palawan	4,510	65,545
Copper concentrates:		Lbs.	
Lepanto Consolidated	Mankayan, Mt. Province	11,438,000	1,229,620
United Paracale	Paracale, Camarines Norte	1,042,000	91,785
Mindanao Mother Lode	Surigao, Surigao	830,620	83,060
Mineral Resources	Labo, Camarines Norte	655,620	70,725
Copper Ore:		Tons	
Hixbar Gold Mining Co.	Rapu Rapu, Albay	25,440	450,360
San Remigio Mines, Inc.	Sibalon, Antique	4,430	22,170
All other base metal sales:	Tons	16,265)	415,705
	Lbs.	4,028,765)	
Total base metal sales:	Tons	1,504,250)	$7,005,560
	Lbs.	17,995,005)	

1/ Filipinas Mining actually sold 35,200 tons of ore, of which 21,220 tons were purchased from Acoje and Sambales Chromite and re-sold.

(d) Coal

Coal deposits of commercial value appear to be concentrated mainly on the island of Cebu, where several small properties were operated before the war, and on Bataan Island, Albay Province in Southeastern Luzon. The Bataan property, located on the northern coast of Bataan Island, is operated by the Liguan Coal Company, and is the only coal mine in the Philippines which has produced consistently on a commercial scale. The mine at Uling, Naga, Cebu, owned by the Philippine Government, is adjacent to the Government's cement plant, which the mine supplied with coal prior to the war. At Malangas in Zamboanga, Mindanao, the Government also owns coal reservations, said to be of a good grade of bituminous coal, but development was only of a preliminary nature when war came. The privately-owned mine on Bataan Island was producing coal for use of the Manila Electric Company and other industrial concerns. Total Philippine production of coal, however, was very limited. Deposits are comparatively small and occur in geological formations difficult to work. Most of the demand for coal, which came chiefly from the railways before the war, was supplied by imports, mainly from Japan.

Stocks of coal on hand at the beginning of the war were soon exhausted, and cocoanut oil has been used extensively as fuel by the Manila Gas Company and other public utilities. Reports from reliable sources indicate that coal stocks at the Government's mine in Cebu were burned by the Japanese to furnish electric power to the city of Cebu, but that the mine itself was not reopened. During hostilities

the plant was wrecked and the mine sealed. Early in 1942 the Japanese broadcast plans to study the possibility of exploiting the Philippine Government's coal property in Zamboanga in connection with the development of industry in Mindanao, and in 1943 the Japanese radio claimed that coal mines at Toledo, Cebu, were scheduled for reopening July 1, following improvements made in transportation facilities. There is believed, however, to be considerable guerrilla activity, as well as passive resistance, in the interior of Cebu, and without the good will of the people it seems doubtful whether the Japanese could meet with much success in developing the Island's small but numerous coal mines.

(e) Petroleum

Petroleum has not been found in commercial quantities in the Philippines, although there have been favorable surface indications. In 1938 the Government turned down an offer of a large American oil company to explore petroleum possibilities, which were reserved for the Government-owned National Development Company. The company was prospecting for oil in the Visayan Islands at the time of the invasion. 1/

Prior to the war, imports of petroleum products into the Philippines averaged 590,000 metric tons annually, over half of which came from the United States, with the Netherlands Indies supplying most of the balance.

1/ Prospecting is believed to have been well started at Barili, in southwestern Cebu, and at Bantayan in the northwestern part of the same island. In October 1941 the National Development Company was planning to drill also at Calubian, in the northwestern part of Leyte Island. At the outbreak of hostilities all equipment was destroyed, but it is believed that the Japanese are in possession of surveys and reports made by Philippine Government specialists on oil fields in this area.

Japanese Occupation - With a minimum of motor traffic, scarcity of inter-island ships, and generally curtailed industrial activities, demand for petroleum products is probably negligible, and it does not seem likely that the Japanese would attempt to carry on exploration activities in the Philippines at present. Necessary supplies probably may be obtained from the Netherlands Indies, but the Japanese indicate in their broadcasts that substitute motor fuels are being utilized. Charcoal made from coconut shells is burned as fuel for trucks, although difficulty has been experienced in securing metal parts to manufacture the charcoal burners. It also is reported that the Japanese are working on a cracking plant for making gasoline and lubricants from coconut and castor bean oil, while frequent references appear to plans for the extraction of industrial alcohol from surplus sugar cane.

(f) Summary of Mining Under the Japanese

From the foregoing survey of Philippine mining resources, it would appear that Japan should obtain from the Islands substantial quantities of iron, all the gold, chrome and manganese she may need, and a small amount of copper. Beyond this, the Philippines are lacking in coal and petroleum, coal having been formerly imported chiefly from Japan and petroleum from the United States and the Netherlands Indies.

Japan's problems are largely those of shipping, transport within the Islands, and repair or replacement of equipment and loading facilities, believed in many instances to have been demolished by military forces. Insufficient blast furnace and

rolling mill capacity in Japan also may prevent full utilization of Philippine iron deposits.

Serious labor difficulties do not seem likely. Highly skilled labor is not necessary in the Philippine mining industry, and the Japanese are in a position to control possible recalcitrants through force, or through their supervision over the food supply.

Information relative to the production status of the mines is conflicting and incomplete, but broadcasts by the Japanese have emphasized that copper and manganese mines were restored by the end of 1942 and are now ready for "large-scale operation." It is reported that two iron mines are being successfully operated and that appreciable quantities of chrome ore have been obtained by the Japanese from the Islands.

(g) Special Problems Incident to Marketing

With a ready outlet for gold in the United States, marketing and distributing of gold presented no special problems. Owing to the long haul, high cost of freight, and absence of a steel industry in the Pacific Coast area, however, there was no market in the United States for iron ore, and except for limited amounts utilized locally, it went entirely to Japan.

As earlier indicated, scarcities in shipping and lighterage facilities now constitute the chief problems in connection with moving Philippine base metal ores to the sole market in Japan, while the mining and marketing of gold appear to have been abandoned.

II. Timber and Lumbering

The forest area of the Philippines is estimated at over 17,686,000 hectares (43,680,000 acres), or approximately 60 percent of the total land area. 1/ About 97.5 percent, including grassland, is owned by the Government and is under the administrative control of the Bureau of Forestry, Department of Agriculture and Commerce, which is charged with protection and management of all public forests. About 2.5 percent of the forest land is privately owned.

(a) Government Policy

Public forests are not for sale. They are developed under a system of cutting licenses issued by the Government against payment of royalties. Two types of licenses were issued by the Commonwealth Government prior to the war, the first, or long-term license agreement, being granted to persons or associations legally authorized to transact business in the Philippines, when the plan of operation was considered sufficient to warrant the holding of a license for 10 years. Under certain conditions specified in the law, the agreement was renewable for ten-year periods, the total period of operation not to exceed 50 years. The second, or ordinary type of license, was generally granted for one year, although five-year licenses are permitted under the law. Since the inauguration of the Commonwealth Government in November 1935, licenses have been granted only to citizens of the Philippines and the United States, or to corporations, at least 60 percent of the capital of which is owned by such citizens.

1/ This does not include 1,300,000 hectares (3,210,000 acres) of forest land covered with cogon (tall grass used for thatching) or grass which may be utilized for grazing. (Hectare equals 2.47 acres.)

(b) Resources, Facilities and Production

Philippine forests are typically tropical and include about 3,000 species of trees yielding a considerable proportion of commercial hardwood timber, especially suited to cabinet work. The total volume of commercial timber was estimated in 1939 at 1,096,080,000 cubic meters, or about 464,740,000 board feet, with an approximate value of $4,000,000,000.

The lauan family constitutes about 75 percent of the total stands, and over 90 percent of the volume. Lauan stands are relatively heavy and admirably suited to lumbering exploitation. Because of their grain, color and texture, as well as durability, red and white lauans are known as "Philippine mahogany" in the American market.

Principal Forest Areas - Leading provinces in which timber was cut in 1940, in the order of their importance in the industry, were Negros Occidental, Negros Island; Zamboanga and Lanao, Mindanao; the Camarines and Mountain Province, Luzon; and Misamis Oriental and Davao, Mindanao. Philippine forests, it is officially stated, could sustain three or four times the present cut without being depleted. The country is thus considered in an excellent position to furnish a steady supply of export timber.

Lumber Industry - The lumber industry was ranked by the Philippine Government in 1939 as fifth in capital invested, fourth in value of production, third in monthly wages, and second in number of laborers employed. 1/

1/ Prior to the 1939 Census, employment in the sawmilling and logging industry was estimated at around 70,000, but the Census reported only 43,871 persons employed in all types of forestry activities, including gatherers of rattan, firewood, barks, etc.

In 1940 there were 148 sawmills in operation, of which only two had a daily capacity of as much as 120,000 board feet. These two, together with about 20 other mills with daily capacities of 20,000 board feet or more, accounted for a large proportion of the total output of sawn lumber. The principal mills are listed below:

Leading Philippine Sawmills 1/

Mill	Location	Daily Capacity in Bd. Ft.
License agreement:		
Insular Lumber Co.	Fabrica, Occidental Negros	125,000
Findlay Millar Timber Co.	Kolambugan, Lanao	120,000
Cadwallader-Gibson Lumber Co.	Tandoc-Butauanan, Siruma, Camarines Sur	70,000
Philippine Lumber Manuf. Co.	Catabangan, Ragay, Camarines Sur	60,000
Atlantic Gulf and Pacific Co.	Dahican, Jose Panganiban, Camarines Norte	60,000
Port Lamon Lumber Co.	Port Lamon, Hinatuan, Surigao	45,000
Mindanao Lumber Co.	Naga-Naga, Zamboanga	40,000
Basilan Lumber Co.	Port Holland, Zamboanga	35,000
Anakan Lumber Co.	Gingoo, Oriental Misamis	30,000
Danawin Sawmill	Danawin, Ragay, Camarines Sur	25,000
Ordinary licenses:		
Philippine Red Lumber Co.	Pata, Claveria, Cagayan	25,000
Jack Wooten Sawmill	Sipocot, Camarines Sur	25,000
Hercules Lumber Co.	Lumarao, Zamboanga	25,000
Mindanao Lumber Co.	Margosatubig, Zamboanga	25,000
Heald Lumber Co.	Bobok, Bokod, Benguet, Mountain Province	20,000
Philippine Lumber Exploration Co.	Casiguran, Tayabas	20,000
NID Lumber Co.	Carabalan, Himamaylan, Occidental Negros	20,000
Oriental Negros Sawmill Co.	Pamplona, Tanjay, Oriental Negros	20,000
Asiatic Philippine Timber Co., Linamon Sawmill	Magoong Iligan, Lanao	20,000
All other mills		772,500
Total approximate daily capacity of all mills		1,582,500

1/ From Semiannual Report of the Director of Forestry of the Philippines for the Period from January 1 to June 30, 1939.

Statistical data relative to timber cut from public forests, and operations of the saw mills during years immediately preceding the war are given below:

		1937	1938	1939 1/	1940 2/
Sawmills	No.	124	141	143	148
Log scale	Cu. M.	2,055,330	1,887,640	1,115,660	1,928,200
Sawn lumber	Bd. ft.	315,870,450	340,381,290	186,447,330	331,972,780
Mill sales	" "	325,274,920	338,646,230	181,669,250	344,173,360
Timber cut	" "	871,461,000	800,360,000	473,039,000	817,557,000
Forest charges paid	Pesos	1,759,250	1,711,170	988,360	2,096,660

(c) Ownership

Of a total investment in sawmilling amounting to about 30,500,000 pesos ($15,250,000) in 1939, American interests controlled 42 percent, while 30 percent was Philippine investment, 10 Chinese, 5 British, and 4 percent Japanese. There were 35 American mills, accounting for 43 percent of the total cut, while 84 Filipino-owned mills accounted for 20 percent. One British and 5 Chinese mills accounted for 8 and 7 percent, respectively, of the total cut, while 3 Japanese operators accounted for 4 percent. 3/

Except for the production of rattan furniture, and the former American cutch factory, minor forest industries are largely unorganized. Filipinos and Chinese constitute the chief furniture makers, and Filipinos the principal gatherers of forest products. As noted earlier, except for about 2.5 percent, the forest area itself is Government-owned.

1/ From January 1 to June 30 only.
2/ Fiscal year July 1, 1939 to June 30, 1940.
3/ Semiannual Report of the Director of Forestry of the Philippines for the Period from January 1 to June 30, 1939.

(d) Markets

Only about 15 percent of lumber produced by Philippine mills, representing the best grades, was normally exported, the domestic market being by far the chief outlet. A large proportion of timber produced was sold in the form of logs, most of which also was consumed locally, especially by the mining industry. The United States, Great Britain, British Africa, and Hong Kong were the chief export markets for sawn lumber, while Philippine logs and timber went mainly to Japan and China. Immediately prior to the outbreak of war in the Philippines shipments of logs to Japan were declining, because of Japanese Government restrictions on imports.

(e) Lumber Industry Under Japanese Occupation

In August 1943 the Director of the Bureau of Forestry and Fishery (announced by the Japanese to be Florencio Tamesis, the former incumbent) stated that 15 sawmills on Luzon were in operation and that within the first 6 months after resumption of activities had produced 8,500,000 board feet of cut timber, totalling over 97,000 cubic meters. The Lumber Producers Association, it was claimed, had succeeded in increasing output and reducing market costs.

To better organize the industry, central and southern districts in Luzon and the Bicol regions 1/ were divided into 21 lumber districts, with the organization of similar districts in the Visayan Islands and Mindanao planned. The several lumber regions will then, it was stated, be grouped into a Federation of Forest Products Producers, and it is expected that the Philippines will soon be able to supply a large part of the lumber requirements of "Greater East Asia."

1/ The Bicol regions include the provinces of Albay, Camarines Norte, Camarines Sur, and Sorsogon, all in southern Luzon.

Forest concessions formerly held by enemy nationals have been placed under the Philippine Lumber Union, which is said to be working in close collaboration with the Lumber Control Association. The latter is the main source of lumber for construction and shipbuilding, as well as firewood, charcoal and material for wooden shoes and slippers, the manufacture of which is said to be a "flourishing industry."

Reports from Chungking in June 1943 indicated that the Japanese are training experts in tropical forests in order to develop the rich forest reserves of the southern regions. There has been some reference to the possibility of rafting timber from the Philippines to Japan, but as this would involve a long voyage across the open sea, it does not seem likely that it would meet with success. Moreover, reports from other than Japanese sources indicate that logging and lumbering operations have been resumed only on a restricted scale. There is known to be an acute shortage of lumber in Manila and prices are very high. It is to be expected that inadequate transportation facilities, both by land and water, have presented major difficulties, while guerrilla activities in many lumbering districts and a shortage of mechanical equipment are further retarding factors in the Japanese effort to revive the lumber industry.

(f) Minor Forest Products

Rattan, firewood, palm products, vines, cutch and tanning barks, gums and resins, and gutta-percha, in addition to timber, are obtained from Philippine forests, both for domestic consumption and for export. 1/ Rattans, found in all forests, enter into many phases of Filipino economic life, being used in the manufacture of furniture and the construction of houses, and for making many small household articles. The production of cutch from mangrove bark was important in Zamboanga Province, Mindanao, until the American-owned cutch factory in Zamboanga City was sold in 1939 to Scottish interests and the plant moved to Borneo. Philippine gums, notably copal and elemi, are especially abundant in Southern Luzon.

Production of some of the more important minor forest products during the fiscal year ended June 20, 1940, was as follows:

Production of Minor Forest Products
Year Ended June 30, 1940

Rattan, split	Pounds	2,134,580
Rattan, unsplit	Feet	149,270,000
Firewood	Cu. ft.	4,790,000
Nipa and buri leaves	Pounds	4,034,600
Vines	"	175,300
Cutch	"	9,704,300
Other tanning bark	"	3,069,800
Copal and elemi gums	"	2,066,600

1/ Although a few species of rubber are indigenous to the Philippines, the production of rubber for commercial purposes is entirely on a plantation basis. About 10,000 acres in southern Mindanao and the nearby island of Basilan were planted in rubber before the war, two American companies accounting for about half the total acreage. Production amounted to about 1,000 tons of rubber annually, of which somewhat less than half was used for the domestic manufacture of rubber-soled shoes, and the balance exported. Plans of the Commonwealth Government to develop rubber plantations in Mindanao did not materialize before the war.

III. Fisheries and Game

The territorial waters of the Philippines include about 705,000 square statute miles of marine waters which abound in a great variety of fish, some of considerable commercial value. With approximately 2,000 species available for the catching, fish is second only to rice in the native diet. The fishing industry, however, is not developed on a business or scientific scale, but is rather the preoccupation of thousands of individuals, many of them depending upon it for much of their daily food or for part or all of the little money income they may have. On the whole, Filipinos have engaged in fishing not as a regular occupation, but to supplement income from agriculture or other pursuits. While poor and inadequate fishing equipment has been a further major drawback to development of the industry, the individual fisherman's failure to comprehend the commercial value of many species in his catch, or to appreciate the importance of conservation, have also been important deterring factors.

(a) Government Policy

Lack of organization in the industry appears to have been no more pronounced than lack of supervision and regulation. The Philippine Government, prior to the war, had directed no comprehensive efforts toward improving the industry or checking destructive and illegal practices. A complete official survey of fishing grounds was never made, giving rise to the charge that Japanese knew much more about Philippine waters than did Filipinos. The extent to which Japanese were able to operate -- at times through the connivance of natives --

was doubtless due in considerable measure to inadequate equipment and personnel of the Fish and Game Administration, a division of the Department of Agriculture and Commerce. In 1940 there were reported to be only ten wardens to enforce fishing laws throughout the entire archipelago, and in many instances irregularities and infractions were, allegedly, tolerated. 1/

Taxation and Fees - Generally high fees and taxes, moreover, led to unwise and illegal practices in the fishing industry. One member of the Fish and Game Administration is quoted as commenting several years ago on fishing in San Miguel Bay, Camarines Sur, as follows:

> "As in most fishing centers in the Islands, local fishery legislation in this region has one purpose — the collection of as much revenue as possible in order to swell the municipal funds for the support of the local government without due consideration for the poor fishermen that have to shoulder the burden. More often than not, legislation has the sole or principal objective of imposing as high taxes and fees as possible, usually prohibitive, with no attention paid to the question of preservation and conservation of the fisheries for future generations."

Confusion and conflict was added to the tax situation by the fact that some taxes and licenses fell within municipal authority while others were the responsibility of the Department of Agriculture and Commerce. Under the Commonwealth Government municipal councils were empowered to enact ordinances with regard to fishing in municipal waters, and to grant to qualified persons licenses for fishing boats of three tons or less, and/or the privilege of fishing with nets, traps, or other gear. Municipal councils also granted permission for

1/ Catherine Porter of the Institute of Pacific Relations, in the Far Eastern Survey, June 19, 1940.

the erection of corrals and the operation of fish ponds or oyster culture beds. Only the Secretary of Agriculture and Commerce, however, issued licenses to fishing boats over three tons gross; to aliens, or boats owned by aliens, or to fishermen previously licensed by the Department of Agriculture and Commerce.

The control of taxation by municipal councils led to a lack of uniform fees, and the generally high cost for the privilege of fishing not only increases costs to the consumer but encourages illegal operations. It is a common practice for fishermen to dynamite or poison rich sea areas in order to increase their immediate catch and pay the required fees, with no regard to the obvious threat to conservation.

Government Steps to Aid Filipino Fishermen - Legislation was enacted in 1939 looking to "nationalization" of the Philippine fishing industry, and by law the only Japanese boats allowed to operate in Philippine waters were those which received permits in or before 1932. After January 1, 1939, all applicants for fishing-boat licenses were required to man their boats with crews of which at least one-third were Philippine citizens. Violations of the law, however, were not infrequent, and Japanese were known to operate boats registered in Filipino names. 1/

The Japanese are the only deep-sea fishermen in Philippine waters, Filipinos themselves lacking the necessary equipment. Early in 1940 the license fee of 10 pesos ($5.00) for three-ton boats was

1/ Eighty percent of all fishing boats were said to be actually owned by Japanese, registered either in their own names or the names of Filipino "dummies," according to a statement made in 1939 by the Secretary of Agriculture and Commerce.

reduced to 5 pesos ($2.50) at the request of Filipino fishermen, in order that they might develop deep-sea fishing. At the same time the National Assembly appropriated funds for the training of Filipino fishermen in deep-sea fishing and for the purchase of modern equipment. Acquisition by the Division of Fisheries of a modern fishing vessel equipped for research and demonstration of offshore fishing was announced in mid-1940, when it was stated that the boat would be used in making a survey of all the more important fishing centers. The Government also sent two specialists to Japan about 1940, one to study technical phases of oyster cultivation and the other to investigate fresh water fishing problems.

Experimental stations maintained by the Government included an oyster farm and a salt water fishery, the latter located at Dagat-Dagatan, between the municipalities of Navotas and Caloocan, Rizal Province, Luzon. Special attention was given to more effective cultivation of bangos (milk fish) and to artificial propagation of other species. In Mindoro, at the mouth of the Lumang-Bayan River, the Government operated a small fish hatchery station from which it was planned to distribute several commercial varieties of fish to various parts of the Islands. The need for cooperative organization in the industry and credit facilities for fishermen was stressed by interested spokesmen, but it is not believed that concrete steps in that direction were taken before war came to the Philippines.

(b) Ownership and Form of Organization

The Census of the Philippines, 1939, reported 94,630 establishments engaged in all kinds of fishing, employing 264,000 persons. 1/ Establishments included 91,400 operated by their individual owners, while 2,584 were partnerships, 584 associations, and 63 corporations. Employees in those establishments operated by their individual owners included 241,290 citizens of the Philippines, 499 Japanese, 387 Chinese and 54 others.

The census returns indicated that the fishing industry is predominately Filipino-controlled. Of total assets amounting to 46,106,300 pesos ($23,053,150) in 1938, 94.8 percent represented investments of citizens of the Philippines. About one percent of the remainder was reported as Japanese investment. A considerable proportion of fish is caught in ponds which are largely privately owned. 2/ Investment in fish ponds in 1938 (included in the total of all assets shown above) amounted to 37,723,660 pesos ($18,861,830), of which 35,833,120 pesos ($17,916,560) represented Filipino investment and 1,821,810 pesos ($910,905) Japanese.

(c) Resources, Facilities and Production

The larger bodies of Philippine marine waters are the Pacific Ocean, which bounds the whole of the eastern shores; the China Sea, washing the entire western coast; and the Sulu and Celebes Seas,

1/ Census of the Philippines: 1939, Volume IV, Chapter III, Fisheries.
2/ In 1940 there were 116,905 acres of privately-owned milk fish ponds and 24,760 acres of ponds owned by the Government.

surrounding the islands which lie to the southwest. Additionally, numerous gulfs, bays, and coves in the lengthy coastline, as well as inland lakes, ponds, rivers and streams, provide fertile marine waters. Provinces of which the shores and inland waters yield the greatest amounts of fish are Bulacan, Rizal, Batangas and Cavite -- all bordering on Manila Bay -- and Sulu Province, consisting of the Sulu Archipelago lying between the Sulu and Celebes Seas. The City of Manila, and the provinces of Bataan, Pampanga, Laguna, Mindoro, Iloilo, and Negros Occidental also are among the more important fishing centers.

Milk fish, or bangos, raised chiefly in ponds on the island of Luzon, account for about a third of the annual catch. 1/ They are considered the most important fish in the native diet, especially in Manila. Shrimp, anchovies, herring, sardines, mackerel, crabs, catfish, caesio, dalag, and bonito are other leading varieties.

Facilities - Large-scale fishing is negligible in the Philippines. In 1938 there were only 199 motored fishing boats of three tons or over, while there were more than 5,000 boats without engines, and over 60,000 bancas and other small fishing craft. The corral, or "baclad," method of fishing is one of the most common, bamboo-constructed corrals being found in practically all suitable places along the coasts and in many lakes and streams. The continued use of corrals in some instances has prevented fish from coming

1/ The main sources of milk fish fry are the northwestern coast of Luzon, Balayan and Batangas Bays (south of Batangas Province), Sulu and Mindoro Islands, and the coasts of Panay, Negros and Cebu, in the Visayan Islands.

into lakes, and waters once full of fish have become relatively barren. Fishing by hook and line is not important, but casting nets are widely used. Frequently nets are too fine, catching the smallest fry, a practice which has tended to further deplete the waters.

All kinds of fishing equipment in use at the end of 1938, together with value thereof, were reported in the Census of 1939 as follows:

Philippine Fishing Equipment - 1938

Kind	Number	Value Pesos
Boats and bancas	66,148	2,870,280
Boats with engines	199	1,240,300
Boats without engines	5,239	673,300
Bancas and small boats ...	60,710	956,680
Nets and lines	80,022	2,091,780
Trawl nets	2,635	708,870
Trap nets	536	85,960
Other nets	40,822	1,112,590
Lines (hapin)	36,009	184,360
Corrals, traps and weirs ...	28,385	1,338,750
Other equipment	--	751,290
Total value		7,052,100

The census classifies the main fishing activities as offshore, inshore, inland, and pond fishing. Lesser amounts of fish are reported as caught by combined offshore and inshore operations and by combined pond and other types of fishing. Offshore fishing is done in deep water with the use of motor-driven boats and large nets. The most important fishes caught in this manner are bonito, caesio, herrings, sardines, red snapper, Spanish mackerel, groupers and anchovies. Inshore fishing employs fish traps, corrals, and nets. Boats used are bancas and other small craft. Fishes caught by inshore fishing include

chiefly anchovies, bonito, shrimps, herrings, sardines, catfish, mullet, cavallas, crabs, dalag, and hito.

Fishermen engaged in inland fresh water fishing -- also using small boats and nets -- catch chiefly shrimps, catfish, dalag, hito, and crabs. Fish ponds are constructed mainly for the raising of bangos (milk fish), crabs, shrimps, gourami, and similar fishes. Most of the fish ponds are in lowlands near rivers and the sea shore.

Establishments engaged in offshore and inshore fishing accounted for more than nine-tenths of the total value of all fishing boats and for almost nine-tenths of the value of all fishing nets, according to the census returns.

Production - Official Philippine estimates of fish production, made by the Department of Agriculture and Commerce in recent years, placed the annual catch at around 950,000 tons, valued at something under $50,000,000. The Census of 1939, however, reported the quantity and value of fish caught in 1938 by all kinds of fishing as 80,930 metric tons, valued at 21,088,690 pesos ($10,544,345). Explanatory notes in the Census state that "the value of fish caught represents the total value at the point of sale or disposal, and includes the value of those sold as well as those consumed by persons engaged in fishing." The reason for the wide discrepancy between estimates made by the Department of Agriculture and Commerce and the Census data, is not entirely clear, but probably is due largely to the fact that the Census reports covered catches of "persons engaged in fishing"

at least on a part-time commercial basis, taking no account of thousands of small daily catches which never reach a market. Countless Filipino families, living near the coasts or on river banks, engage in fishing only for their own daily consumption, and generally without the formality of obtaining fishing licenses. Also unrecorded by the Census are large quantities of mud fish caught each year in paddy fields, especially during the rainy season. Such fish are retained by the rice farmers for their own use.

Census data, moreover, were obtained for only 22 specific kinds of fish, and while figures for "other fishes" are shown, they may possibly not include all the remaining varieties reaching the markets. The fact that there was no standard unit of measure in use throughout the Islands for recording quantities may also have affected the completeness of the Census reports. Petroleum cans, wooden pans, baskets, and boxes -- all of varying sizes -- were employed in different sections for reporting the catch, while in some districts schedules of the number of fish caught were received in Manila, adding to the difficulties involved in converting to a uniform unit of measure for tabulating the returns.

In view of the circumstances, it is believed that the Census report may represent only a small proportion of the total annual catch, and that estimates of the Department of Agriculture and Commerce more nearly depict the importance of fishing in native economy of the Philippines.

The leading kinds of fish caught in 1938, as reported by the Census, were as follows:

Fish Caught in Philippine Waters - 1938

	Metric tons	Pesos 1/
Anchovy	5,824	1,116,300
Bangos	14,645	7,086,150
Bonito	1,485	700,750
Caesio	2,150	529,150
Catfish	2,135	505,610
Chub mackerel	2,620	563,640
Crabs	2,534	402,830
Dalag	1,909	393,850
Herrings and sardines	4,465	994,980
Mullet	1,265	275,160
Nemipterid	1,388	309,420
Siganid and surgeon	1,135	242,680
Shrimps	6,165	1,438,990
Other fishes	33,210	6,529,180
Total	80,930	21,088,690

(d) Preservation and Marketing of Fish

Sun-drying and salting are the most common methods of preserving fish throughout the Philippines, although smoking -- especially of sardines, herrings, and to some extent bangos -- is carried on extensively in Manila. The "bagoong," a fermented fish preparation, is a method of preserving fish in salt, common in the Philippines as in other Malayan tropics. Cold storage plants in the larger cities, such as Manila, Cebu and Iloilo, supply the markets with iced or frozen fish. It is usual for the larger fishing vessels to carry a cargo of ice, while trucks transporting catches from fishing centers to the markets are loaded with ice.

1/ Peso equals $0.50 in U. S. currency.

Canning of fish was only recently introduced in the Philippines. The National Food Company, subsidiary of the Commonwealth Government, built a cannery at Guagua, in the vicinity of fish ponds in Pampanga Province, central Luzon, for the preservation of bangos. The plant was reported to have a capacity of 6,000,000 cans of fish a year. The Government also operated a cannery at Estancia, Iloilo, Panay, and one in the Pureza compound, Manila. In 1937 a Filipino-Japanese controlled organization established a plant in Zamboanga for canning tuna fish, largely for export. Capacity of the cannery was said to be about 4,800 cans a day, and exports in 1939 and 1940 amounted to 568 and 509 metric tons, respectively. The tuna was sold almost entirely in the United States.

Inherent difficulties in the marketing of fish have presented problems for native fishermen. Many times truck owners charge unreasonably high rates to transport fish to the markets, causing partial if not total loss of profit for the fishermen. Chinese middlemen, who own "bagoong" plants, or other means of preservation, also dictate prices which the native must accept because of the perishability of his product, while storage charges at city ice plants or refrigeration units are usually high. It was, in part, to correct such inequalities that measures, already referred to, were being considered by the Commonwealth Government just prior to the war to establish cooperative movements for the assistance and guidance of Filipino fishermen.

(e) Fishing Industry Under Japanese Occupation

Fishing operations in Manila Bay were suspended for a very long period after the outbreak of war owing to military activities in that area. Even after the fall of Corregidor, fishing was prohibited by the Japanese, ostensibly because of the danger of floating mines, but possibly because the Japanese feared sabotage or spying by Filipino fishermen.

In more recent months, the Japanese appear to be showing special interest in reviving the fishing industry, but Manila broadcasts imply that conditions are not entirely satisfactory. Prices of fish are steadily rising in the public markets, and there is understood to be a very marked reduction in the quantity of fish reaching Manila. In the absence of fuel for motorized fishing vessels, trawling operations are practically at a standstill, and frequently bangos and other pond fishes are the only varieties available in quantity.

Fishing operations apparently are strictly regulated by the Japanese who forbid the construction or maintenance of fishing devices without a license from the Director of Forestry and Fisheries. Weekly permits for pond fishing, however, may be issued by the governors of certain provinces, if approved by the Japanese military forces. The increased manufacture of fishing nets in two of Manila's cordage factories is expected to supply not only Philippine demands, but the entire "Greater East Asia Sphere," according to an announcement from Davao late in June 1943. The same broadcast referred to large catches of bonita and tunny off the coasts of Davao and Zamboanga Provinces,

and stated that Japanese fishing guilds would encourage the preparation of dried bonita, which has a large market in Japan and other Eastern areas.

Early in November 1943 a conference of Government fishery officials and representatives of the Shipping Association reportedly was held under the auspices of the Food Administration. An improved system of distribution, lowering of prices, and the elimination of middlemen allegedly were discussed. Late in November the Philippine Fishing Federation was inaugurated. Headed by the Director of the Bureau of Forestry and Fishery, the Federation is to "promote the fishing industry."

(f) Game Fowl and Animals

Philippine game birds include ducks, snipes, curlews, many species of doves and pigeons, jungle fowl, plovers, sandpipers, and godwits. There is good snipe shooting near Manila and in many localities throughout the Islands. Ducks have no permanent feeding stations, but are usually abundant wherever found. Doves and pigeons appear in large numbers in forested districts. The jungle fowl, only typically oriental game bird found in the Philippines, is not very common, but appears in lightly wooded country.

Wild hogs, deer, carabaos, and cattle are hunted in the Islands, as well as monkeys and tamaraws. The last-named is peculiar to the island of Mindoro, and, it is claimed, is not found elsewhere in the world.

IV. Water and Water-power

A mountainous country, with heavy seasonal rainfall, the Philippines possess many rivers and streams. Large rivers, however, are comparatively few. Rising in high altitudes, they descend rapidly to the sea, and frequent torrential rains increase the likelihood of river banks overflowing. The numerous streams, in general, are also short and swift.

There are five main rivers, the fertile valleys of which form the great agricultural plains of the Philippines. The Cagayan River, rising in the mountains of Luzon and flowing north into Babuyan Channel, drains an area of about 10,000 square miles in Northeastern Luzon, while the Pampanga and Agno Rivers water the great plateau region of Central Luzon. The Pampanga empties into Manila Bay to the south, and the Agno, flowing north, into Lingayen Gulf, scene of the early Japanese invasions. The remaining two large rivers are in Mindanao. The Agusan flows north into the Mindanao Sea, while the winding Rio Grande de Mindanao, rising in the Lanao-Bukidnon upland, empties into Illana Bay on the west coast.

Philippine lakes are of great variety and diverse origin. The three largest inland bodies of water are Laguna de Bay and Lake Taal, both in Southern Luzon, and Lake Lanao in Central Mindanao.

(a) Government Policy

Notwithstanding the prevalence of swift rivers and streams, progress toward the development of water-power resources on a modern

scale has been relatively slow, although the use of water power had its beginning in a very small way in the days of the Spaniards. Relics of crude water wheels used for turning sugar and rice mills still remain in many localities, while reports of early Spanish army engineers also have survived to furnish leads for more recent investigators. Prior to the Commonwealth regime, however, there was only one large hydro-electric power generator in the Islands, the plant in Laguna Province, south of Manila, operated by the American-owned Manila Electric Company.

Total hydro-electric capacity at the beginning of the Commonwealth amounted to 24,860 H.P., of which the Laguna plant furnished 17,633 H.P., while a plant of the Benguet Consolidated Mining Company, Mountain Province, furnished 2,140 H.P. Small, scattered projects accounted for the balance. 1/ Comparatively few investigations of possible new sites or measurements of streams had been made. Some authorities claimed that most of the streams in the Islands, while adaptable for generating a few hundred horsepower or energy for local industries, were not susceptible to commercial development for hydro-electric projects on a large scale.

(b) Development of Water Power Under the Commonwealth

With inauguration of the Commonwealth in 1935, however, it became apparent that if industrialization was to be encouraged, in line with commitments of the new regime, cheap power must be provided. The Government, therefore, was granted constitutional authority to control

1/ For details see Part X, Public Works and Utilities.

all power sites and power development projects, and in its first session, the National Assembly appropriated 250,000 pesos ($125,000) as initial capital of the National Power Corporation.1/ The Government agency was authorized to issue bonds in the amount of 20,000,000 pesos ($10,000,000) to finance the development of the country's hydroelectric resources.

Under impetus of the new incentives, the first Federal power project was well under way by 1940. The plant, located about 40 miles from Manila, at Caliraya in Laguna Province, was to have a total capacity of 30,000 k.w., and power generated was to be used for both industrial and public utility purposes. The project was nearing completion toward the close of 1941, machinery having arrived from the United States just prior to arrival of the Japanese. It is understood that the Japanese military authorities utilized American engineers to install the machinery and operate the plant. In July 1942 Tokyo announced its completion.

Plans for Future Development - The Japanese probably also fell heir to reports made by the National Power Corporation in conjunction with American Army engineers on about 250 sites. Potential production was reckoned at from 200 horsepower for the smallest to 400,000 for the largest, and estimated costs for such projects ranged from $62.50 per kilowatt to $1,000 or more. Two of the largest sites investigated were those on the Agno River in Luzon and on the Agus River, near Lake Lanao, in Central Mindanao.

1/ Commonwealth Act No. 120 empowered the Government to control the acquisition and development of all power sites and projects.

Natural conditions were considered expecially favorable at the Mindanao location. Water is collected in Lake Lanao, 700 meters (about 2,300 feet) above sea level, and discharged through a series of cascades and water falls down the Agus River, which empties into the sea about 17 miles from the outlet of the lake. It was estimated that as much as 400,000 horsepower could be developed at low cost. The main problem in the area of the Mindanao site was that of a market, and to supply this the Government had under consideration the erection within the district of a steel mill and industrial establishments. It was expected that the Agno River project in Mountain Province, Luzon, would approximate the Government's plant at Caliraya in cost and production capacity. Power from such a project would be available for sale to mines in the Baguio district, where fuel and transportation costs are high.

(c) Water-power Under the Japanese

In 1942 the Japanese announced plans to treble the Islands' hydro-electric generating capacity in 1943, stating that new dams would be constructed, a river diverted and the capacities of existing plants increased. While it was later claimed that 36 water-power plants were build, or rebuild, during 1943, toward the close of the year Shozo Murata, the supreme adviser to the Japanese military administration in the Philippines, lamented the fact that in Sumatra a great hydro-electric project was "in a far more advanced state that the hydro-electric enterprise at Lake Lanao in Mindanao."

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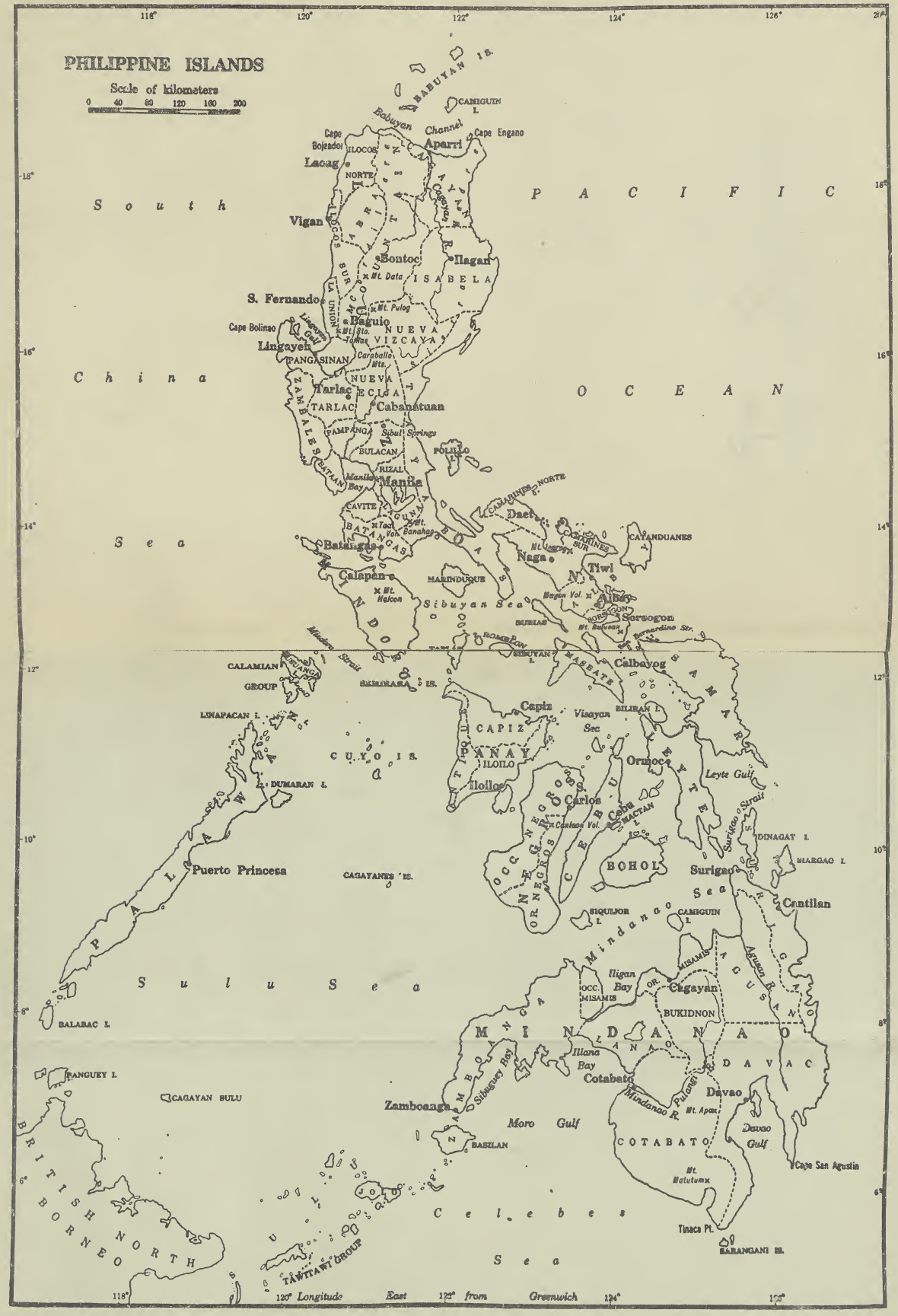

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